DOCUMENT RESUME

ED 205 605 TM 810 515

AUTHOR Halpin, Glennelle: And Others
TITLE Comparison of the Incremental Validity of the California Achievement Tests with That of the ACT and SAT When Used with High School GPA to Predict College GPA.
SPONS AGENCY Auburn Univ., Ala.
PUB DATE Mar 81
GRANT 79-225
NOTE 11p.: Paper presented at the Annual Meeting of the Eastern Educational Research Association (Philadelphia, PA, March, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Achievement Tests: *College Entrance Examinations: *Comparative Analysis: Grade Point Average: Grade Prediction: *Predictive Validity: *Scores: Test Validity
IDENTIFIERS ACT Assessment: California Achievement Tests: Scholastic Aptitude Test

ABSTRACT

One purpose of this study was to compare the incremental effectiveness over high school grade point average (GPA) alone of the American College Testing Program (ACT) assessment, the Scholastic Aptitude Test (SAT), and the California Achievement Tests (CAT) in predicting college freshman GPA. A second purpose was to look at the relative effectiveness of the high school GPA, the ACT, the SAT, and the CAT in predicting college freshman GPA. Data were collected from 1453 college freshman. High school grades predicted college GPA better than the ACT, the SAT, or the CAT. Each of the three tests provided an increase in predictive efficiency of 18.47 percent. The ACT, the SAT, and the CAT all possessed the same incremental validity. (Author/BW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED205605

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Comparison of the Incremental Validity of the California Achievement Tests With That of the ACT and SAT When Used With High School GPA to Predict College GPA[1]

Glennelle Halpin, Gerald Halpin,
and Barbara Brown Schaer

Auburn University

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
G. Halpin
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

TM 810 515

Paper presented at the meeting of the Eastern Educational Research Association, Philadelphia, March 1981.

[1]This study was partially supported by Grant No. 79-225 from the Auburn University Grant-in-Aid Program.

Comparison of the Incremental Validity of the California Achievement Tests With That of the ACT and SAT When Used With High School GPA to Predict College GPA

With the accountability movement in education came an avalanche of testing. Existing tests were utilized or new tests were developed to measure competencies of students. Masses of test score data have thus accumulated. But is this information being maximally utilized? Could, for example, results of standardized measures given in high schools as a routine part of the established testing program be utilized in the decision-making process whereby high school students are admitted or denied admission to colleges?

Presently the aptitude tests most commonly used for college admission are the Scholastic Aptitude Test (SAT) or the American College Testing Program tests (ACT), but test results from testing programs which may be available on all graduates within a state might be a viable alternative which college admissions personnel have failed to consider. The use of alternative measures such as standardized achievement tests or state competency tests is defensible because, as Kelley (1927) suggested many years ago, when aptitude/intelligence tests are correleated with achievement tests, the two measures often have enough in common to be considered measures of a single trait rather than separate traits. It seems that we must question the practicality of having large-scale standardized testing and/or competency testing programs which may cost thousands of dollars to administer but which are not fully utilized.

Consider the cost of aptitude tests normally required for college admission. These tests typically cost $8.00 per student at a minimum for a total, at a large university with 2500 entering freshmen, of $20,000.00. When considering the impact of spiraling inflation upon tuition and other college expenses, is

it not about time to ask if alternative measures are as effective as the traditional aptitude measures in predicting college grades?

Even beyond a study of the relative merits of traditional and alternative tests as predictors of grades in college is a more basic question proposed by Sechrist (1963): do either achievement measures or aptitude tests provide any increment over the readily available and inexpensive high school grade point average in predicting college success? Also, in addition to the question regarding the incremental effectiveness of tests over high school grade point average in predicting college grades is a question regarding the differential incremental effectiveness of achievement and aptitude tests in predicting college grade point average.

Although incremental validity has not been a serious undertaking for test developers or test users, a few studies have been conducted with different instruments. Sines (1959), for example, found that even though the Rorschach ink blot test did yield better-than-chance predictions when used alone, it did not add to other information obtained from interviews and a biographical data sheet. In fact, the Rorschach produced a net decrement in predictive efficiency. Predictions were actually more valid when the interview and biographical data were used alone.

Using multiple and partial correlation techniques, Ford (1950) presented data supporting the incremental validity of the Cooperative Science Test. The use of the Cooperative Science Test in combination with high school grades did result in a more accurate prediction of grades in nursing school than did the use of high school grades alone.

In a study of the predictive efficiency of the College Entrance Examination Board, Fincher (1974) used the index of forecasting efficiency which provides a

more sensitive statement of the magnitude of the incremental validity than does the information provided by multiple and partial correlation techniques alone as employed by Ford. He found an increase of approximately 46% in predictive efficiency for males and 43% for females when using the Scholastic Aptitude Test in addition to high school grade point average in 19 colleges in the University System of Georgia.

Halpin, Halpin, and Hauf (1976) investigated the effectiveness of the ACT in increasing the validity of that obtained using only high school grade point average in predicting success in a 3-year nursing program. Using data obtained over a 10-year period the authors utilized the index of forecasting efficiency in addition to multiple correlation procedures and obtained an increase of predictive power greater than 100% for each of the 3 years when the ACT was used to supplement high school grade point average to predict grades in the school of nursing.

These studies, representative of the few studies dealing with incremental validity, are certainly not a substantial base for educational decision making or, more specifically, for determining the best predictors of success in college. One purpose of this study, then, was to compare the incremental effectiveness over high school grade point average alone of the American College Testing Program assessment (ACT), the Scholastic Aptitude Test (SAT), and the California Achievement Tests (CAT) in predicting college freshman grade point average. A second purpose was to look at the relative effectiveness of the high school grade point average, the ACT, the SAT, and the CAT in predicting college freshman grade point average.

Procedure

Of the 2,000 plus freshmen entering in the fall the large state university where this study was conducted, 1453 were subjects for this study. These 1453 freshmen were graduates the preceding spring of public high schools in the state where the university is located. Of this group 1445 had ACT scores and 198 had SAT scores on file at the university admissions office. All had high school grade point averages on file at the admissions office and, by the end of their first academic year of study, college freshman grade point averages as well. On file in their respective high schools or at the State Department of Education were CAT scores for 1294 of these freshmen.

High school grade point averages, freshman year college grade point averages, ACT scores, and SAT scores for each respective subject were obtained from the university admissions office. Scores on the California Achievement Tests were obtained from respective high schools or from the State Department of Education when not obtained from the high schools.

Bivariate correlation coefficients were computed between the predictors of ACT composite, SAT composite (verbal + quantitative), CAT total, and high school GPA and the criterion measure of college GPA for the freshman year. Three multiple correlation coefficients were then computed. The first multiple correlational analysis combined high school GPA and the ACT composite in predicting freshman GPA. The second multiple correlation combined high school GPA and the SAT composite in predicting freshman GPA. The last multiple correlation utilized high school GPA and the CAT composite as predictors of the freshman GPA criterion. In each multiple correlational analysis high school GPA was the first variable entered into the equation to determine the incremental value as well as the

differential incremental validity of the ACT, SAT, and CAT above that of the high school GPA in predicting freshman GPA.

To further analyze the incremental validity and the differential incremental validity of the ACT, SAT, and CAT, the resulting bivariate and multiple correlations were converted to indices of forecasting efficiency ($E = 100\ [1 - \sqrt{1 - r^2}]$). Differences between the bivariate index and each of the multiple indices were then ascertained. These differences were divided by the bivariate index to obtain a relative estimate of the percent of increase in predictive efficiency for the ACT, SAT, and CAT.

Results

The bivariate correlation coefficients reported in Table 1 between the predictor variables of ACT, SAT, CAT, and high school GPA and the criterion of freshman GPA were .37, .42, .38, and .49, respectively. High school GPA thus accounted for about 24% of the variation in freshman GPA while the ACT, SAT, and

---

Insert Table 1 About Here

CAT accounted for 14%, 18%, and 14% of the variation in freshman GPA, respectively. The multiple correlation coefficients, also reported in Table 1, were each .53 for the combined predictors of high school GPA and, respectively, the ACT, the SAT, and the CAT as they related to freshman GPA. Each two-variable combination accounted for 28% of the variance in college grades during the freshman year.

The indices of forecasting efficiency for high school GPA alone and in combination with the ACT, SAT, and CAT are presented in Table 2 along with the percentage of increase in predictive efficiency arising from the use of the ACT,

Insert Table 2 About Here

SAT, and CAT, respectively, in addition to the GPA. When high school GPA was used to predict freshman GPA, the margin of predictive error was reduced by 12.83 percentage points. When the ACT, SAT, and CAT were used in addition to high school GPA, each of the three measures reduced the margin of predictive error an additional 2.37 percentage points for a total reduction of 15.20%. Use of the ACT, SAT, and CAT, respectively, in addition to high school GPA resulted in an increase in predictive efficiency of 18.47% for each test. These three predictors did not therefore demonstrate differential incremental predictive efficiency since the increase was the same for each.

Conclusions

1. As is frequently the case, high school grades predicted college freshman grades better than either the ACT or the SAT. High school grades were also a better predictor of freshman GPA than was the CAT.
2. While the use of either the ACT, SAT, or CAT in addition to high school GPA accounted for only about 28% of the total variation in freshman grades, each of the three measures provided an increase in predictive efficiency over high school GPA alone of 18.47%.
3. Since the ACT, SAT, and CAT possessed the same incremental validity, the CAT, which, in this study, was regularly administered as a part of the state testing program, could be used as effectively in combination with high school grades as either the ACT or SAT in predicting college grades.

References

Fincher, C. Is the SAT worth its salt? An evaluation of the use of Scholastic Aptitude Tests in the University System of Georgia over a thirteen-year period. Review of Educational Research, 1974, 44, 293-305.

Ford, A. H. Prediction of academic success in three schools of nursing. Journal of Applied Psychology, 1950, 34. 186-189.

Halpin G., Halpin, G., & Hauf, B. Incremental validity of the ACT test battery for predicting success in a school of nursing over a 10-year period. Educational and Psychological Measurement, 1976, 36, 433-437.

Kelley, T. L. Interpretation of educational measurements. New York: World Book Company, 1927.

Sechrist, L. Incremental validity: A recommendation. Educational and Psychological Measurement, 1963, 23, 153-158.

Sines, L. K. The relative contribution of four kinds of data to accuracy in personality assessment. Journal of Consulting Psychology, 1959, 23, 483-492.

Table 1

Means, Standard Deviations, Numbers, and Correlational Analyses for High School GPA, ACT, SAT, and CAT as Predictors of College Freshman GPA

	Variable	$\bar{X}$	SD	N	/	Variables 1	2	3	4	5
1.	ACT	22.19	3.86	1445			.52	.79	.41	.37
2.	SAT	1035.96	162.94	198		170		.38	.53	.42
3.	CAT	164.98	22.72	1294		1266	174		.41	.38
4.	High School GPA	3.22	.58	1446		1436	1281	196		.49
5.	Freshman GPA	2.28	.78	1453		1266	1268	194	1439	
6.	High School GPA and ACT									.53
7.	High School GPA and SAT									.53
8.	High School GPA and CAT									.53

Note. For variables 1 through 5 means, standard deviations, and numbers of subjects are to the left in the table. To the right are results of the bivariate correlational analyses above the diagonal and numbers of subjects in each analysis below the diagonal. For variables 6 through 8 multiple correlation coefficients are reported.

Table 2

Indices of Forecasting Efficiency
Using High School GPA Separately
and in Combination with ACT, SAT,
and CAT to Predict College Freshman GPA

Efficiency Indices HSGPA Alone	HSGPA in Combination	Differences in Efficiency Indices	Percent of Increase in Efficiency
12.83			
	ACT: 15.20	2.37	18.47
	SAT: 15.20	2.37	18.47
	CAT: 15.20	2.37	18.47